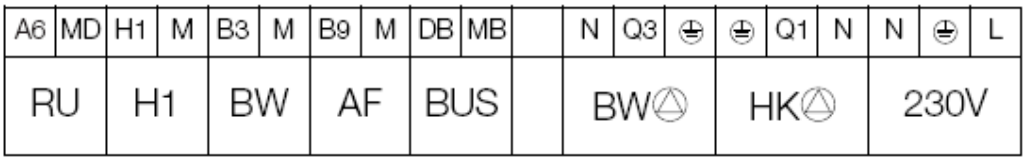
ProCon HT Commissioning Data.

To ensure that the ProCon HT Cascade Manager operates satisfactorily the following sensors or substitute resistors must installed.
A QAD/Z 21 Flow Sensor (Located on the system side of the low loss header. Remote sensor (QAD 21) required on cascade manger.)
A QAD/Z 21 Return Sensor (Located on the boiler side of the low loss header.)
A QAC32 Outside air sensor or Substitute Resistor simulating –1^{0}C (620.Ohms) (Part #RES620)

LPB Wiring Configuration and Type

The interconnecting cascade wiring from the ProCon HT Cascade Master to the ProCon HT Cascade Slaves must be connected as follows:

In a parallel configuration using screened cable. (The screening must be earthed)



Terminal Rail located under cover plate at rear face of boiler - top l/h

LPB Connections.

MB

DB

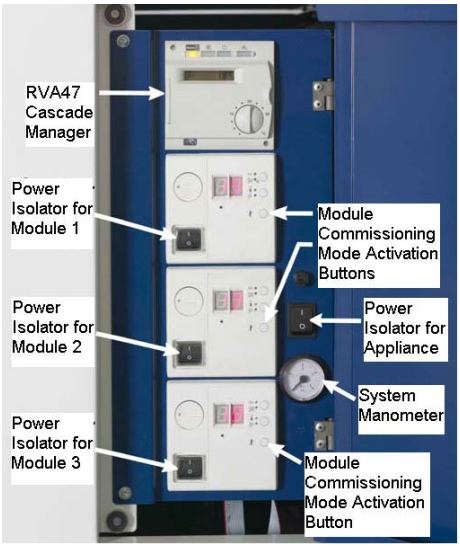
Communication Operation Indications

The RED LED on the OCI420 communication clip mounted on the front of each LMU64 module controller flashes to indicate the detected operational status of the module dictated by the LPB communication from the ProCon HT Masters RVA47 Cascade Manager.

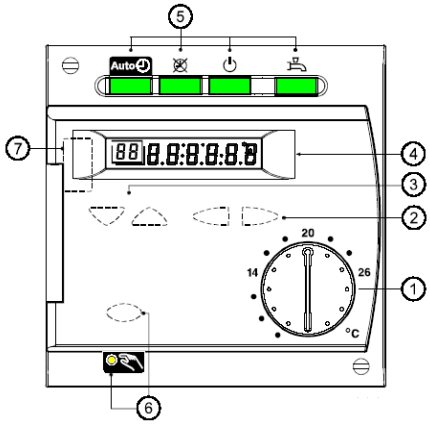
LED FLASH STATUS	INTERPRETATION OPTIONS
LED ON Constantly	OCI420 not configured to operate with LMU64
LED OFF Constantly	OCI420 Configured. LPB Short Circuit / No Power.
LED ON 93% OFF 7%	OCI420 and LUM64 Not Compatible / LPB Address inadmissible.
LED ON 5% OFF 95%	Boiler being controlled via LPB and required to be not operating.
LED ON 5% OFF 20% ON 5% OFF70%	Boiler being controlled via LPB and required to be operating.

Appliance Controls

Control Panel


RVA47 Cascade Manager
Power Isolator for Module 1
Power Isolator for Module 2
Power Isolator for Module 3
Module Commissioning Mode Activation Buttons
Power Isolator for Appliance
System Manometer
Module Commissioning Mode Activation Button

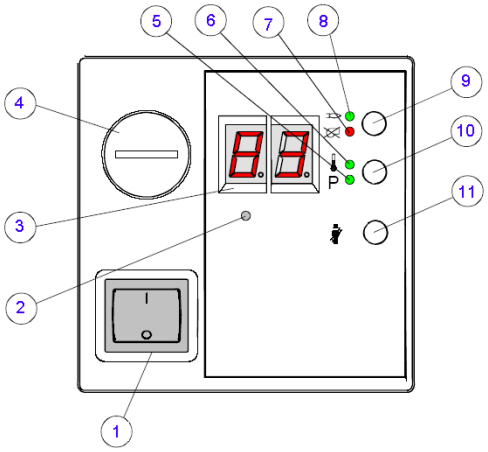
RVA47 Cascade Manager



Legend

1. Room Temperature Set Point Adjuster. Assumed Room Temperature if no Room Unit Fitted
2. Parameter Setting Buttons - / +
3. Parameter Line Selection Buttons Down / Up
4. Display Screen
5. Mode Selection Buttons. Operating Mode Indication
   - Automatic Operation
   - Continuous Operation On / Off
   - Standby
   - HWS On / Off
6. Manual Override Button and Indicator
   - Manual Operation On / Off
7. Computer Access Port

Module Controller



Legend

1. Module Power Isolator
2. Infrared Output to Flue Gas Analyzer Optional Extra.
3. Module Numerical Indicator
4. Temporary Connection Port For QAA73 for LMU 64 Configuration.
5. Indication of System Pressure P (Not Used)
6. Indication of Module Over Temperature
7. Indication of Module Lockout
8. Indication of Module Burner Activation
9. Module Lockout Reset Button (To be pressed for at least 3 Seconds)
10. Display Alteration Button
11. Commissioning Mode Activation Button

Module Controller End User Settings.

The Module Controller provides access to the End User adjustable parameters P parameters along with other operational information only settings A, B, C & D parameters.

End User Adjustable Parameters. (Default = Recommended Settings)

Parameter	Function	Range	Default
P0			
P1	Required Module Flow Temperature / Room Temperature. (Outside air sensor attachment dependant. Without = Flow Temperature)	20-90^{0}C / 10-30^{0}C	85 / 20^{0}C
P2	Required HWS Set Point. (Only Used if the Module is Directly Controlling HWS Generation)	10-80^{0}C	60^{0}C
P3	Not used in This Configuration	NA	NA
P4	Not used in This Configuration	NA	NA
P5	Weather Compensation Curve Heating Circuit 1	-- / 40	32
P6	Weather Compensation Curve Parallel Displacement	-31 / +31	0

Accessing Module Parameters

1. Press the display mode button (10) to choose display level «P» (keep button depressed).
2. Press the display mode button (10) to choose the required parameter (press button briefly).
3. Adjust the value:

Changing parameters: (only P0...P6)

Only parameters P0...P6 can be changed.
To do this, wait until the value of the parameter flashes on the display (3).
Proceed as follows:

P ❍ (+) or (Enter) — Increase value (+): Press display mode button (10) briefly several times (< 1 second)

❍ (-) — Decrease value (-): Press chimney sweep button (11) briefly several times (< 3 seconds)

P ❍ (+) or (Enter) — Save value (Enter): Press display mode button (10) for **at least** 3 seconds

If the displayed value does not require amending or the altered setting is not required do not press any buttons on the controller for a period greater than 12 seconds.

As a confirmation, the display (3) shows P0...P6 in consecutive order and the newly adjusted value.
The new value will only be adopted **after storage**.

Reviewing the Parameter Values

To query the different parameter values, proceed as follows:

Choosing the display mode

Choose the display mode by pressing button (10) for **more than 3 seconds** (display (3): A...).
Keep button (10) depressed to reach the different display levels b, C, d, P
and back to A.
Release the button when the required display level is reached (A, b, C, d, P).

Choosing and displaying individual values or parameters

To change between the different values or parameters (0… max. 7) of the different display levels (A, b, C, d, P), **press button (10) briefly.**
The current value appears about 2 seconds after choosing the relevant parameter.

Module Operating Codes

			LED [1]	
Display level	**Name of LMU... variable**	**Description**	6	P 5
General information (enduser level) [2]				
A 0	Meldecode	Diagnostic code (system)	✳	✳ [3]
A 1	TkIst	Boiler temperature (flow)	●	❍
A 2	TbwIst1	D.h.w. temperature sensor 1	✳	❍
A 3	Druck	Water or air pressure	❍	●
A 4	Betr.Phase	Operating phase of burner control	❍	❍
A5	TiAussen	Outside temperature (only AGU2.310...)	❍	❍
Temperatures (service level)				
b 0	DiagnoseCode	LMU...-internal software diagnostic code	✳	✳ [3]
b 1	TkRuec	Boiler return temperature	●	●
b 2	TbwIst2	D.h.w. temperature sensor 2	●	●
b 3	Tabgas	Flue gas temperature	●	●
b 4	TiAussen	Outside temperature	●	●
b 5	TaGem	Composite outside temperature	●	●
b 6	TaGed	Attenuated outside temperature	●	●
b 7	TvIst	Flow temperature AGU2.500...	●	●
Process values (service level)				
C 1	IonStrom	Ionization current	●	●
C 2	Gebl_Drehz	Fan speed	●	●
C 3	Gebl_PWM_AusAkt	Current fan control (PWM)	●	●
C 4	RelModLevel	Relative output	●	●
C 5	Pumpe_PWM	Pump setpoint (PWM)	●	●
C 6	ek0	Control differential	●	●
Setpoints (service level)				
d 1	Tsoll	Setpoint of 2-position or modulating controller (PID)	●	●
d 2	TkSoll	Current boiler temperature setpoint	●	●
d 3	TsRaum	Room temperature setpoint	●	●
d 4	TbwSoll	D.h.w. temperature setpoint	●	●
d 5	PhzMax	Maximum degree of modulation in heating mode	●	●
d 6	NhzMax	Maximum speed at maximum output in heating mode	●	●
Parameters (service level) (Prog Mode) (setting only with special functions or 4) – not with AGU2.310...				
P 0	PhzRelMmi	Start output controller stop (only in operating mode **without** the appropriate setpoint potentiometer, otherwise locked)	●	✳
P 1	Tr/TvSollMmi	Room / flow temperature setpoint (only in operating mode **without** the appropriate setpoint potentiometer, otherwise locked)	●	✳
P 2	TbwSollMmi	D.h.w. setpoint (only in operating mode **without** the appropriate setpoint potentiometer, otherwise locked)	●	✳
P 3	reserviert	Reserved	●	✳
P 4	NqmodMin	Minimum pump speed	●	✳
P 5	Sth1	Slope HC1	●	✳
P 6	DTR1	Parallel displacement HC1	●	✳

1)	LED: ✳ = flashing, ● = lit, ❍ = dark
2)	The parameters of group «**A**» can also be selected by briefly pressing the button for the display mode
3)	Indication flashes alternately
4)	Setting the heating curve when using the heating circuit module AGU...

Note: After about 8 minutes, the display will automatically change to the boiler temperature «**A1**»

Appliance Error Codes

If a fault is encountered within the appliance or Cascade LPB network, a fault code will be generated and displayed by the failing module and all LPB networked RVA47 Cascade Managers.

If a fault is encountered by a module the respective code will be displayed along with a flashing LED. Three digit codes will be displayed in two consecutive sections. I.e. 1-53 = 153.

If a fault is encountered by a RVA47 Cascade Manager or communicated to a RVA47 Cascade Manager via the LPB network ER will be generated on the display.

Opening the controllers flap and pressing the Down PROG button twice will gain access to parameter line 50 where the generated fault code can be reviewed.

In either case the fault code should be noted for future reference.

If the fault is related to a specific module the unit can be rest by pressing the Lockout Reset Button (9) for at least 3 seconds.

If the fault is related to a RVA47 Cascade Manager or the LPB communication network the fault code will clear automatically following the rectification of the fault.

This is also applicable following the rectification of any module fault. This can take up to 10 minutes.

Fault Code	Description
E-0	No Error Detected
E-10	Outside Air Sensor Fault / Not Detected
E-20	Flow Water Sensor Fault / Not Detected
E-26	System Flow Sensor Faulty / Not Detected
E-28	Flue Gas Sensor Fault / Not Detected
E-40	Return Water Sensor Fault / Not Detected
E-46	System Return Water Sensor Fault / Not Detected
E-50	HWS Sensor Short Circuit 1
E-52	HWS Sensor Short Circuit 2 (Not Used)
E-58	HWS Volt Free Switch Fault / Not Detected
E-60	Faulty Room Sensor
E-61	Faulty Room Sensor
E-62	Incorrect Room Unit Connected
E-77	Air Pressure Sensor Not Detected (Not Used)
E-78	Water Pressure Sensor Defective (Not Used)
E-81	LPB Short Circuit (Boiler Cascade Wiring)
E-82	LPB Address Conflict (Boiler Cascade Settings)
E-86	Short Circuit on PPS Connection (Not Used in ProCon Configuration)
E-91	EEPROM
E-92	Hardware Malfunction
E-100	Conflict Between Time of Day Master Control (Boiler / QAA70 / RVA47)
E-105	Module Requires Annual Service (QAA73 Room Unit Required to Rest Timer)
E-110	Module Water Temperature Overheat
E-111	Module Temperature Too High (Auto Resetting)
E-113	Flue Gas Temperature overheat (Not Used)
E-117	High System Water Pressure Sensor (Not Used)
E-118	Low System Water Pressure Sensor (Not Used)
E-119	System Water Pressure Switch Activated (Below 0.8 bar)
E-124	Module Temperature Too High (Auto Resetting)
E-128	Flame Extinguished During Operation (LMU Version D)
E-129	Air Supply Error. Fan speed incorrect during operation. (LMU Version D)

E-130	Flue Temperature Too High (Auto Resetting)
E-131	Fault With Burner
E-132	External Safety Interlock Activated (Open Circuit)
E-133	No Flame Detected After Final Ignition Attempt
E-134	Flame Extinguished During Operation LMU Version C)
E-135	Air Supply Error. Fan speed incorrect during operation. (LMU Version C)
E-140	LPB Segment / Address Not Recognized (Boiler Cascade Settings)
E-142	LPB Missing Partner (Boiler Cascade Settings)
E-145	Wrong Device Connected to PPS Circuit (Not Used in ProCon Configuration)
E-146	Unrecognized Plant Configuration
E-147	Burner Modules Not Connected (PPS Circuit Not Used in ProCon Configuration)
E-148	LPB Interface Not Configured (Boiler Cascade Settings)
E-150	General Boiler Fault
E-151	Module LMU64 Controller Malfunction
E-152	Module LMU64 Controller Parameter Programming Error
E-153	Module Control Interlocked
E-154	Module Operating Outside of Predefined Parameters. (System Hydraulic Error.)
E-160	Fan Not Reaching Set Point
E-161	Module Combustion Fan Speed Too High
E-162	Air Pressure Switch Fault (Not Used)
E-164	Flow Switch / Pressure Switch Open (Not Used)
E-166	Air Pressure Switch Fault (Not Used)
E-180	Module Operating in Chimney Mode 100% Output
E-181	Module Operating in Commissioning Mode
E-183	Module Controller / QAA73 Room Unit in Parameter Setting Mode

Control Parameter Default Settings.

RVA47 Cascade Manager Settings.

The Single and Cascade Master units are preset for correct operation.

The following Pages detail the parameters of the RVA47 Cascade Manager and the Standard Factory settings, please note, the installer/commissioning engineer may have changed some of these settings to suit the system installed.

There are two levels of access available, as follows. If you cannot access a particular parameter line, please consult with MHG's Technical Department for further assistance.

Level One (End User)	-	Open The Hinged Flap. Use either of the ▽△ Program Buttons to access the desired parameter line. (Parameter Line range 0-50) Use the -/+ Buttons to alter the required parameter. Once all alterations have been completed press the AUTO button to exist this level.
Level Two (Installer)	-	Open The Hinged Flap. Press & Hold the ▽△ Program Buttons simultaneously for more than 3 seconds until Parameter # 51 appears. Use either of the ▽△ Program Buttons to access the desired parameter line. (Parameter Line range 51-173) Use the -/+ Buttons to alter the required parameter. Once all alterations have been completed press the AUTO button to exist this level.
Level Three (OEM)	-	Open The Hinged Flap. Press & Hold the ▽△ Program Buttons simultaneously for up to 9 seconds until - - - - - appears. A password will be required to access this level. (Down Down Plus Minus Plus) Use either of the ▽△ Program Buttons to access the desired parameter line. (Parameter Line range 2-92) Use the -/+ Buttons to alter the required parameter. Once all alterations have been completed press the AUTO button to exist this level.

Complete RVA47 Cascade Controller Parameter Settings.

The defaults indicated below are for standard systems.
If additional control features are required alteration will have to be made.
Please refer to the RVA47 manual for additional details.

#, -, ---	Indicates where an input can be made if required.
--	Indicates where an input can not be made and a sensed / attenuated figure is displayed. 'OFF' will be displayed if the +/- buttons are used.

[#]	Description	Range	150 & 225 Single	150 & 225 Master Cascade
	End User Level			
1	Time of Day	00:00-24:00	As Required	As Required
2	Weekday	1-7	As Required	As Required
3	Date	00:00	As Required	As Required
4	Year	1900-3000	As Required	As Required
5	Day of Week	1.7 1.5 6.7 1-7	As Required	As Required
6	Heating Time Switch 1st On Time	00:00-24:00	06:00	06:00
7	Heating Time Switch 1st Off Time	00:00-24:00	22:00	22:00
8	Heating Time Switch 2nd On Time	00:00-24:00	-	-
9	Heating Time Switch 2nd Off Time	00:00-24:00	-	-
10	Heating Time Switch 3rd On Time	00:00-24:00	-	-
11	Heating Time Switch 3rd Off Time	00:00-24:00	-	-
13	Required HWS Temperature	40-60	55	55
14	Heating Night Setback Temperature	10-30	16	16
15	Frost Protect Temperature	4-15	10	10
16	Summer/Winter Changeover Temperature	8-30	30	30
17	Weather Compensation Curve. If a 0-10 volt signal is the required heat generation control method for the RVA47 / boiler installation this setting must be adjusted to -- on all RVA47s present in the boiler cascade installation. This will result in the Auto, On/Off and Frost lights becoming inactive. Alteration to parameter #170 and #172 will also be required.	0-40	32	32
18	Actual Room Temperature	0-50	--	--
19	Actual Outside Temperature (Pressing the + & - buttons simultaneously until the display stops flashing will reset the averaged value.)	-50-+50	--	--
23	Restore User Level Factory Presets	0-1	0	0
30	Hot Water Time Switch 1st On Time	00:00-24:00	06:00	06:00
31	Hot Water Time Switch 1st Off Time	00:00-24:00	22:00	22:00
32	Hot Water Time Switch 2nd On Time	00:00-24:00	-	-
33	Hot Water Time Switch 2nd Off Time	00:00-24:00	-	-
34	Hot Water Time Switch 3rd On Time	00:00-24:00	-	-
35	Hot Water Time Switch 3rd Off Time	00:00-24:00	-	-
50	Fault Code Display	0-255	--	--
	Engineer Level			
51	Output Test 0. Automatic control 1. All outputs off 2. HWS pump/valve on 3. Circulating pump on	0-3	0	0
52	Input Test 0. Return Temperature 1. HWS Temperature 2. Flow Temperature 3. Outside Temperature 4. Room Temperature 5. 0-10 Volt Required Temperature	0-5	0	0
53	Plant Type	0-100	--	--
56	Actual System Flow Temperature	0-140	--	--
57	Actual System Return Temperature	0-140	--	--
59	Actual System HWS Temperature	0-140	--	--
60	Attenuated Outside Air Temperature	-50-+50	--	--
61	Composite Outside Air Temperature	-50-+50	--	--
62	Outside Air Temperature Source	00.01/14.16	--	--
66	Maximum System Flow Temperature	8-85	--	--
69	Maximum HWS Temperature	8-85	--	--

[#]	Description	Range	150 & 225 Single	150 & 225 Master Cascade
70	Nominal Room Temperature Set Point	0.0-35.0	--	--
71	Set Point Of Room Temperature	0.0-35.0	--	--
72	System Flow Temperature Set Point	0-140	--	--
75	Modules Available in Cascade	00.1/16.3	--	--
76	Lead Module in Cascade	00.1/16.3	--	--
77	Hour of Operation Until Sequence Change	0.990	--	--
95	Heating Pump Output (HKP) Output Functions	1-5	1	1
100	Displacement Of Weather Compensation Curve	-4.5 - +4.5	0	0
101	Gain Factor/Room Influence 0. Active 1. Inactive	0-1	1	1
102	Room Temperature Switching Differential	---/0.5-4	---	---
103	Minimum System Flow Temperature	8-95	8	8
104	Maximum System Flow Temperature	8-95	82	82
105	Building Construction Type 0. Heavy 1. Light	0-1	1	1
106	Adaptation of Heat Curve 0. Inactive 1. Active	0-1	0	0
107	Optimum Start Time Maximum Forward Shift. 00:00 Inactive	00:00-06:00	00:00	00:00
108	Optimum Stop Time Maximum Forward Shift 00:00 Inactive	00:00-06:00	00:00	00:00
109	Heating Zone Quick Setback Constant	0-20	2	2
110	Over Heat Protection Heating Zone Pump	0-1	0	0
117	Legionella Protection Function 0. Off. 1. On	0-1	0	0
118	Legionelle Protection Temperature	8-95	65	65
119	HWS Pump Operation Function. (Stored > Flow Temp) 0. Off 1. Always On 2. Only On When Boiler is Interlocked Off Via 170=3	0-2	0	0
120	Reduced HWS Temperature Set Point	8-70	40	40
121	HWS Time Control 0. 24 Hours per Day 1. As Heating Time Switch Settings 2. As HWS Time Switch Settings	0-2	2	2
122	HWS Pump Control 0. Heating Time Switch Setting Apply 1. HWS Time Switch Settings Apply	0-1	1	1
123	HWS Control in Cascade System 0. Controlled Via Master RVA47 Manager 1. Controlled Via All RVA47 Managers in Segment 2. Controlled Via All RVA47 Managers In LPB System	0-2	2	2
124	HWS Charging Cycles Per 24 Hour Period 0. One Per Day with 2.5 Hour Forward Shift from Heating Time Switch Setting 1. Several Per Day with 1 Hour Forwarding Shifting from Heating Time Switch Setting	0-1	1	1
125	HWS Temperature Control 0. QAZ21 Sensor 1. Volt Free Enable via Thermostat	0-1	0	0
126	System Flow Temperature Boost When HWS Enabled	0-30	20	20
127	HWS Priority / Shifting 0. Absolute Priority 1. Shifting Priority. Heating Reduced to Increase HWS Recovery 2. No Priority. HWS and Heating Operate in parallel 3. Shifting / Absolute Heating Switched OFF, Mixing Circuit Decreased (RVA46) to Increase HWS Recovery.	0-3	1	1

[#]	Description	Range	150 & 225 Single	150 & 225 Master Cascade
130	Hours Of Operation Prior to Sequence Rotation	10-990	10	10
131	Changeover Sequence Program 0. No Exemptions 1. The First Module is Exempt 2. The Last Module is Exempt 3. The First and Last Modules are Exempt	0-3	0	0
132	Module Designated as Fixed Lead Unit	00.1-16.3	---	---
133	Cascade Enable Delay Time	1-120	1	1
134	Anti Cycling Time (Seconds)	0-1800	30	30
140	LPB Control Address 0. Single RVA47 Manager. (Not used in FS Configuration.) 1. Master RVA47 Manager 2….16. Slave RVA47s Operating From Master RVA47 Manager	0-16	1	1
141	LPB Control Segment 0. Heat Generating Units (RVA47s) 1…14. Heat Consuming Units (RVA46s)	0-14	0	0
142	LPB Power Supply 0. Off 1. On	0-1	1	1
143	Operation of LPB Power Supply	On/Off	On	On
144	Display of LPB Communication	On/Off	On	On
145	Changeover Via LPB Connection 0. All Controllers in Same Segment 1. All Controllers in LPB System	0-1	1	1
146	Summer/Winter Changeover Via LPB 0. Local Control Only 1. Entire Control Via LPB	0-1	0	0
147	Central Standby Switching 0. Deactivated 1. Activated	0-1	0	0
148	Clock Mode 0. Autonomous All Clocks Can Have Different Times 1. System Time Without Adjustment 2. System Time With Adjustment 3. System Clock Master. There Can Only be One Master	0-3	2	2
149	Auto Time Adjustment Spring Date and Month of Last Sunday in March	Date/Month	25.03	25.03
150	Auto Time Adjustment Autumn Date and Month of Last Sunday in October	Date/Month	25.10	25.10
170	Operation of H1 Terminal 0. Changeover of Operation When Volt Free Switch is Made. (HWS Stopped) 1. Changeover of Operation When Volt Free Switch is Made. (HWS Unaffected) 2. Minimum Flow Temperature Maintained When Volt Free Switch is Made. (Set at 171.) 3. Heat Generation Stopped When Volt Free Switch is Made.(Frost Active) 4. 0-10 Volt Control to Vary System Flow Temperature. (Curve set at 172) (Terminal #1. 0-10 volt. Terminal #2. Ground.) {If a 0-10 volt signal is the required heat generation control method for the RVA47 / boiler installation this setting must be adjusted to 4. Alterations must also be made to parameter #17. The setting must be adjusted from 32 to – on all RVA47s present in the boiler cascade installation. This will result in the Auto, On/Off and Frost lights becoming inactive. Possible alterations to parameter #172 may also be required.}	0-4	0	0

[#]	Description	Range	150 & 225 Single	150 & 225 Master Cascade
171	Minimum Temperature Set Point Via H1 (170 = 2)	8-95	80	80
172	Maximum Temperature Set Point Via H1 (170 = 4)	5-130	82	82
173	Operating Action of H1 control contacts. 0. The contact is Normally Closed. 1. The contact is Normally Open. {The RVA47 will operate according to its internal time switches and presets. **If a remote BMS is controlling the RVA47 via a Volt Free switch across H1 '0' should be inserted.** This will allow the boilers operate when the Volt Free switch is made and stopped (Blocked.) when the switch is opened. If you are controlling the lead (master) RVA/Boiler via a volt free switch across H1, all slave modules should be left with '1' as the input. This will allow the AUTO light and the OFF light to indicate their operational mode dictated by the lead (master) RVA/Boiler.}	0-1	1	1
	OEM Level			
2	Maximum Module Temperature When Operating In Manual Mode	8-120	82	82
8	Pump Run On Time System Heating (HKP) and HWS (SLP) Pumps	0-20	3	3
22	Minimum System Return Temperature	8-95	8	8
30	Room Influence Gain Factor	0-20	4	4
32	Boost Room Temperature Set Point Room Sensor Dependant (QAA10/50/70) Increase. Heat Up Time Reduced Decrease Heat Up Time Increased	0-20	5	5
33	Frost Protection 0. Frost Protection Program Disabled 1. Frost Protection Program Enabled	0-1	1	1
35	Heat Gains Increase. If Heat Gains are High Decrease. If Heat Gains are Low	-2-+4	0	0
36	Adaptation Sensitivity 1 Outside Air Range 4-12°C	1-15	15	15
37	Adaptation Sensitivity 2 Outside Air Range <4°C	1-15	15	15
40	Maximum HWS Set Point	8-80	60	60
41	HWS Switching Differential (QAZ21 Sensor Only)	0-20	5	5
42	Legionella Function 0. Off 1. On	0-1	0	0
50	Cascade Strategy 1-3 Automatic 4-6. Fixed	1-6	3	3
51	Minimum % Output reached Prior to Switching Off a Module In the Cascade	5-100	20	20
52	Maximum % Output Reached Prior to Switching On o Module In The Cascade	5-100	85	85
56	Time Spent By Module On Ignition Rate Prior to Modulation (Delay Time Between Modules)	0-1200	0	0
60	Minimum Temperature Difference Between Flow/ Return Sensor Readings Prior to The Return Sensor Becoming Lead	0-20	2	2
90	Display Default 0. Time of Day 1. System Flow Temperature (CA)		0	0
91	Software Version	00.0-99.9	#	#
92	RVA47 Manager Operating Hours	0-500,000	--	--

Control Parameter Default Settings.

Module LMU64 Setting.

The Standalone and Cascade Master units are preset for correct operation.
However the slave units may require modest parameter updating. (Usually limited to H605)

The following Pages detail the parameters of the modules and the Standard Factory settings, please note, the installer/commissioning engineer may have changed some of these settings to suit the system installed.

To access the parameters detailed below a QAA73 Room Unit is require. The unit must be connected to the respective Module Controller Via the dedicated Plug, Behind cover plate (4) or directly to the respective LMU64 module controller. Via the X10:01 Terminal.

There are two levels of access available, as follows. If you cannot access a particular parameter line, please consult with MHG's Technical Department for further assistance.

Level One (Installer) - Press & Hold the ▽ ⊡+ or △ ⊡- Program Buttons simultaneously for at least 3 seconds. Use the ▽△ Program Buttons to access the desired parameter line. Use the ⊡- ⊡+ Button to alter the displayed parameter to the required setting.

Level Two (OEM) - Press & Hold the ▽△ Program Buttons simultaneously for at least 3 seconds Use the ▽△ Program Buttons to access the desired parameter line. Use the ⊡- ⊡+ Button to alter the displayed parameter to the required setting.

An altered parameter will be saved to the controllers memory by leaving the displayed parameter when either of the ▽△ Program Buttons are pressed.

To exit the parameter review and amendment levels the INFO Button of the QAA73 must be pressed. Any unsaved parameter alterations will be lost if the QAA73 is version 1.3 or lower.

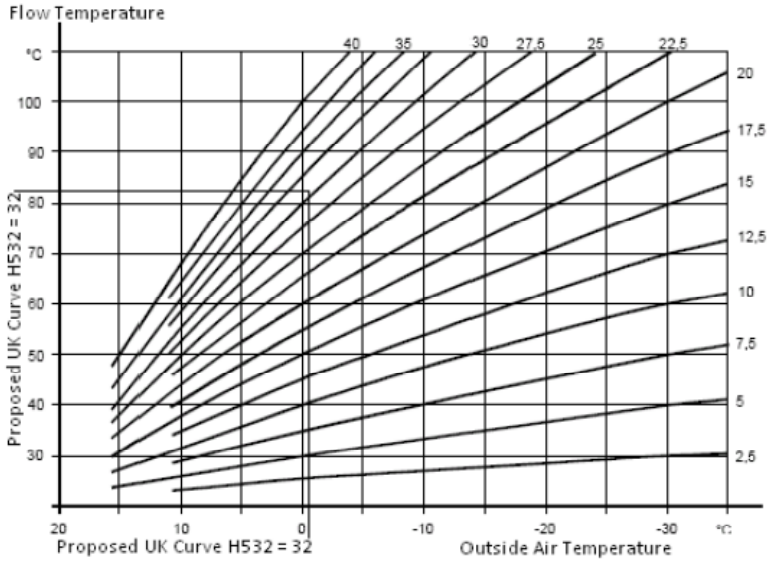
QAA73 #	Description	Range	150 & 225 Single Defaults	150 & 225 Cascade Master Defaults	150 & 225 Cascade Slave Defaults
H90	Reduced Temperature for DHW	8….60	10	10	10
H91	DHW Production Control *(0=Time control 1=Constant)*	0…1	0	0	0
H93	DHW Production Control 0=Non Eco 1=Eco	0…1	0	0	0
H94	DHW Secondary Pump Control *(0= As H91. 1= As HWS Time Switch) (K2, X2:03, H615:6)*	0…1	0	0	0
H503	Minimum boiler setpoint temperature *(20 °C<=TkSmin<=TkSmax)*	20 ... 90 °C	20	20	20
H504	Maximum boiler setpoint temperature *(TkSmin<=TkSmax<=90 °C)*	20 ... 90 °C	90	90	90
H505	Boiler setpoint at design outside temperature	20 ... 90 °C	85	85	85
H506	Minimum flow setpoint temperature *(20 °C<=TvSmin<=TvSmax)*	20 ... 90 °C	25	25	25
H507	Maximum flow setpoint temperature *(TvSmin<=TvSmax<=90 °C)*	20 ... 90 °C	90	90	90
H516	Summer / winter changeover temperature *(30 °C: S / W changeover deactivated)*	8 ... 30 °C	18	18	18
H532	Heating curve slope heating circuit 1	1 ... 40	32	32	32

QAA73 #	Description	Range	150 & 225 Single Defaults	150 & 225 Cascade Master Defaults	150 & 225 Cascade Slave Defaults
H533	Heating curve slope heating circuit 2	1 ... 40	32	32	32
H536	Maximum speed at maximum output in heating mode *(maximum speed limitation)*	0 ... 9950 rpm	7000	7000	7000
H541	Maximum degree of modulation in heating mode *(LmodTL <= PhzMax <= LmodVL)*	0 ... 100 %	100	100	100
H542	Minimum boiler output in kW *(lower calorific value)*	0 ... 9999 kW	15	15	15
H543	Maximum boiler output in kW *(lower calorific value)*	0 ... 9999 kW	75	75	75
H544	Overrun time of pumps, max. 210 min *(setting 255: continuous operation of Q1)*	0 ... 255 min	10	10	10
H545	Minimum burner pause time *(heat demand-dependent switching hysteresis)*	0 ... 3600 s	300	300	300
H551	Constant for quick setback without room influence	0 ... 20	2	2	2
H552	Hydraulic system adjustment	0 ... 255	80	80	80
H554	Setting flags: status code open-circuit sensor for ANx channel suppressed / not suppressed	0 ... 255	b0=1 b1=0 b2=1 b3=1 b4=0 b5=1 b6=0 b7=0	b0=1 b1=0 b2=1 b3=1 b4=0 b5=1 b6=0 b7=0	b0=1 b1=0 b2=1 b3=1 b4=0 b5=1 b6=0 b7=0
H555	Setting flags	0 ... 255	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0
H558	Setting flags	0 ... 255	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0
H596	Running time of actuator in heating circuit 2 *(TimeOpening / TimeClosing)*	30 ... 873 s	150	150	150
H605	LPB device number of LMU * Module numbering 150 Stand Alone & Master Upper 2 Lower 3 Cascade Slave Upper 4, Lower 5.....16 ETC 225 Stand Alone & Master Upper 2, Middle 3, Lower 4 Cascade Slave Upper 5, Middle 5, Lower 6.....16 ETC	0 ... 16*	2,3, (150)* 2,3,4 (225)*	2,3, (150)* 2,3,4 (225)*	4,5-16 (150)* 5,6,7-16(225)*
H606	LPB segment number of LMU	0 ... 14	0	0	0
H614	Program input LMU basis	0 ... 255	3	3	3
H615	Function programmable output K2 LMU	0 ... 255	0	0	0
H618	Progr input on clip-in function module	0 ... 255	0	0	0
H619	Function output1 clip-in function module	0 ... 255	0	0	0

QAA73 #	Description	Range	150 & 225 Single Defaults	150 & 225 Cascade Master Defaults	150 & 225 Cascade Slave Defaults
H620	Function output2 clip-in function module	0 ... 255	0	0	0
H621	Function output3 clip-in function module	0 ... 255	0	0	0
H622	Maximum value of heat demand with external predefined temperature setpoint *(5 °C< = TAnfoExtMax< = 130 °C)*	5 ... 130 °C	85	85	85
H630	Setting flags of maintenance alarms	0 ... 255	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0
H636	Months (interval) since last service visit	0 ... 255 months	0	0	0
H700	1st Historical Fault – Number of Occurrences.				
H701	1st Historical Fault – Operating Phase.				
H702	1st Historical Fault – Operating Error Code				
H703	2nd Historical Fault – Number of Occurrences.				
H704	2nd Historical Fault – Operating Phase.				
H705	2nd Historical Fault – Operating Error Code				
H706	3rd Historical Fault – Number of Occurrences.				
H707	3rd Historical Fault – Operating Phase.				
H708	3rd Historical Fault – Operating Error Code				
H709	4th Historical Fault – Number of Occurrences.				
H710	4th Historical Fault – Operating Phase.				
H711	4th Historical Fault – Operating Error Code				
H712	5th Historical Fault – Number of Occurrences.				
H713	5th Historical Fault – Operating Phase.				
H714	5th Historical Fault – Operating Error Code				
H715	Current Historical Fault – Number of Occurrences				
H716	Current Historical Fault – Operating Phase.				
H717	Current Historical Fault – Operating Error Code				
H718	Hours run burner	0 ... 131070 hrs	0	0	0
H719	Hours run heating mode	0 ... 131070 hrs	0	0	0
H720	Hours run DHW heating	0 ... 131070 hrs	0	0	0
H721	Hours run zone	0 ... 131070 hrs	0	0	0

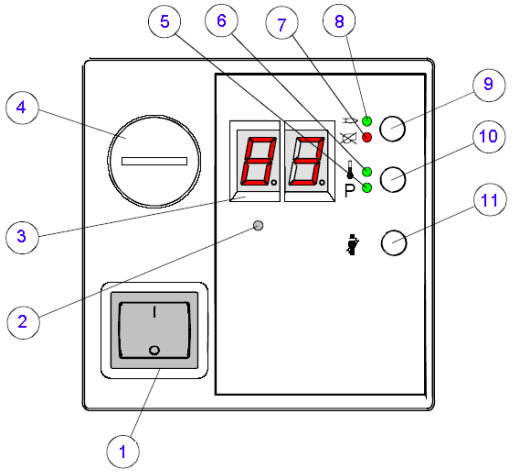
QAA73 #	Description	Range	150 & 225 Single Defaults	150 & 225 Cascade Master Defaults	150 & 225 Cascade Slave Defaults
H722	Start counter	0 ... 327675	0	0	0
H727	Current Fault Code – ALBATROS Error Code	0 ... 583			
H728	1st Historical Fault – ALBATROS Error Code				
H729	2nd Historical Fault – ALBATROS Error Code				
H730	3rd Historical Fault – ALBATROS Error Code				
H731	4th Historical Fault – ALBATROS Error Code				
H732	5th Historical Fault – ALBATROS Error Code				
H732	Current Historical Fault – ALBATROS Error Code				
H755	Measured value of ionization current	-			

Weather Compensation Curve



Module Controller

Legend



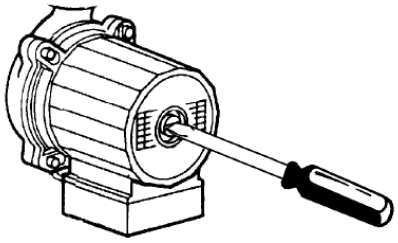
1. Module Power Isolator
2. Infrared Output to Flue Gas Analyser Optional Extra.
3. Module Numerical Indicator
4. Temporary Connection Port For QAA73 Unit
5. Indication of System Pressure **P** (Not Used)
6. Indication of Module Over Temperature
7. Indication of Module Lockout
8. Indication of Module Burner Activation
9. Module Lockout Reset Button (To be pressed for at least 3 Seconds)
10. Display Alteration Button
11. Commissioning Mode Activation Button

Commissioning The Appliance

Pre-Commissioning Checks

Prior to undertaking the commissioning of the unit please ensure that the system water has been cleansed and treated with a suitable inhibitor as detailed in Filling the system and system water quality.

Prior to applying power to the individual modules their dedicated circulation pumps should be bleed and checked to ensure free rotation of the armature.



Combustion System Commissioning.

The commissioning function enables the boiler to be started up in heating mode by pressing the Chimney Sweep Button (11) on the module controller.

There are two levels of operation accessed via the Chimney Sweep Button (11)

Operation at Maximum Output With No Adjustment.

Pressing the Chimney Sweep Button (11) for more than 3 seconds but less than 6 seconds places the respective module in High Fire mode.

To indicate that the module is operating under the control of the Chimney Sweep Button the display (3) will indicate SF and the red Lockout LED (7) will flash with a single pulse.

This mode is maintained until the limit thermostat temperature is reached or the Chimney Sweep Button is pressed from more than 1 second.

Operation at Maximum or Minimum Output For Flue Gas Analysis and Gas Valve Adjustment

Pressing the Chimney Sweep Button (11) for more than 6 seconds. places the respective module in High Fire mode.

To indicate that the module is operating under the control of the Chimney Sweep Button the display (3) will indicate 100 for High Fire and 0 for Low Fire and the red Lockout LED (7) will flash with a double pulse.

To alternate the module between High Fire and Low Fire the Chimney Sweep and **P** Buttons must be pressed for less than 1 second.

P Button	High Fire	**Button**	Low Fire

This mode is maintained until the limit thermostat temperature is reached or the Chimney Sweep Button is pressed from more than 1 second.

Whilst the module is operating under the control of the Chimney Sweep Button (with adjustment) the gas valve can be adjusted to give correct flue gas analysis readings.

Each module is equipped with a modulating gas valve.

The modulating gas valve must be set at High Fire and Low Fire to ensure correct operation throughout its modulating range.

It is advisable to check the combustion figures on High and Low Fire prior to carrying out any adjustments.

Adjusting the High Fire has a marked effect on the Low Fire figures.
Where as adjusting the Low Fire has little effect on the High Fire figures.

The High fire adjustment is carried out via the 2.5mm Allen Key socket D

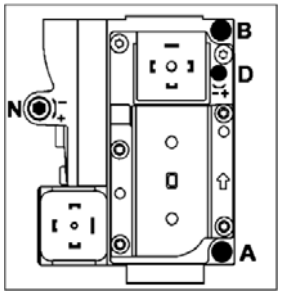
The High Fire adjustment is a Gate type restrictor.

Therefore turning the screw clockwise will close the gate and thus restrict the quantity of gas passing through to the burner.

The Low fire adjustment is carried out via the 2.5mm Allen Key socket N

The Low Fire adjustment is a diaphragm governor.

Therefore turning the screw clockwise will increase the pressure on the diaphragm and thus increase the quantity of gas passing through to the burner.



Legend
A. Valve Inlet Gas Pressure Test Point
B. Valve Outlet Gas Pressure Test Point
D. High Fire Adjuster (Gate Type)
N. Low Fire Adjuster (Governor Type)

Each module must be analysed and adjusted separately.

This is undertaken by inserting the analysers probe in to the silicone sampling tube secured to the top of each module and sealed with a black plug. If fluctuating figures are obtained the flue gas analyzer probe should be inserted into the respective modules flue spigot following the temporary removal of the silicone tube.
(Taking care not to dislodge the grommet.)

Each module must be set to the following combustion figures.

Gas Type	Injector Size	High Fire	Low Fire
Natural Gas (G20)	15mm	8.5% $C0_2$	9.0% CO_2
LPG (G31)	10mm	11.0% CO_2	11.0% CO_2